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Personal Fitness
• PHYSICAL ACTIVITY HAS TREMENDOUS HEALTH-PROMOTING AND DISEASE-PREVENTING BENEFITS.

• A growing number of Americans are sedentary.

• Sedentary lifestyles are linked to dramatic increases:
  • Obesity
  • Diabetes
  • Other chronic diseases.

• More than 145 million Americans are overweight or obese, 73.6 million have high blood pressure, 16.8 million have coronary artery disease, 23.6 million have diabetes, and 57 million have pre-diabetes.
Physical Activity for Health, Fitness, and Performance

- **Physical Activity for Health**
  - The American College of Sports Medicine (ACSM) and the American Heart Association (AHA) recommend that adults under 65 years of age should perform **30 minutes of moderate-intensity activity 5 days per week**.
  - The U.S. Department of Health and Human Services recommends **150 minutes of moderate physical activity per 7 days**.

- **Physical Activity for Fitness**
  - *Physical Activity*—bodily movement that involves muscle contractions and an increase in metabolism
  - *Exercise*—planned, structured, repetitive bodily movement
  - *Physical fitness*—the ability to perform regular moderate to vigorous levels of physical activity **without excessive fatigue**
Physical Activity for Health, Fitness, and Performance

- Physical Activity for Performance
  - Programs designed to increase speed, strength, endurance, or specific muscle strength
Components of Physical Fitness

Cardiorespiratory fitness
Ability to sustain aerobic whole-body activity for a prolonged period of time

Muscular strength
Maximum force able to be exerted by single contraction of a muscle or muscle group

Muscular endurance
Ability to perform high-intensity muscle contractions repeatedly without fatiguing

Flexibility
Ability to move joints freely through their full range of motion

Body composition
The amount and relative proportions and distribution of fat mass and fat-free mass in the body
Benefits of Regular Physical Activity

- **Improved Cardiorespiratory Fitness**
  - Increased ability of the circulatory system to provide oxygen
  - Reduced risk of heart disease
  - Prevention of hypertension
  - Improved blood lipid and lipoprotein profile

- **Reduced Cancer Risk**
  - Breast and colon cancer

- **Improved Bone Mass**
  - Osteoporosis
Benefits of Regular Physical Activity

- **Improved Weight Control**
  - Exercise combined with moderate decrease in food intake can help a person lose weight.

- **Prevention of Diabetes**
  - Exercising 150 minutes per week and eating fewer calories and less fat could *prevent* or delay the onset of type 2 diabetes.
  - Improved respiratory function
Benefits of Regular Physical Activity

- **Improved Immunity**
  - Moderate exercise gives the immune system a temporary boost in the production of cells that attack bacteria.
  - Extreme exercise may be detrimental to immune function.

- **Improved Mental Health and Stress Management**
  - Exercise reduces stress levels by accelerating the body’s return to a balanced state.

- **Longer Life Span**
  - Moderate to high levels of activity increases life span by 1.3 to 3.7 years.
Some Health Benefits of Regular Exercise

**BRAIN**
- Reduces stress and improves mood
- Decreases risk of depression
- Decreases anxiety
- Improves concentration
- Increases oxygen and nutrients to the brain

**BREASTS**
- Decreases risk of breast cancer in women

**HEART**
- Decreases risk of heart disease
- Strengthens the heart
- Increases volume of blood pumped to the body

**LUNGS**
- Improves respiratory capacity
- Improves ability to extract oxygen from the air

**LIVER AND PANCREAS**
- Increases rate of metabolism
- Reduces risk of type 2 diabetes

**BONES**
- Increases bone density
- Strengthens bones
- Decreases risk of osteoporosis

**COLON**
- Decreases risk of colon cancer

**BLOOD VESSELS**
- Increases levels of good cholesterol (HDL)
- Lowers resting blood pressure
- Decreases risk of atherosclerosis
- Improves circulation

**JOINTS**
- Increases range of motion
- Reduces the pain and swelling of arthritis

**MUSCLES**
- Increases muscle strength and tone
- Improves muscle endurance and coordination
Cardiorespiratory Fitness

- **Aerobic “with oxygen” Exercise**
  - Exercise performed at moderate levels of intensity for extended periods of time increases your heart rate
  - Aerobic capacity ($VO_2\text{max}$) is the maximum volume of oxygen consumed by the muscles during exercise
  - Components of an aerobic exercise program (FITT)
    - *Frequency*
    - *Intensity/target heart rate*
    - *Time*
    - *Type of activity*
      - *Running*
      - *Walking*
      - *Swimming*
      - *Hiking*
Cardiorespiratory Fitness

- **Determining Exercise Frequency**
  - Best improvements seen if one exercises vigorously at least three times a week

- **Determining Exercise Intensity**
  - Target heart rate zone – 220 minus the person’s age
    - Ex: $220 - 20 = 200$ target heart rate
  - Borg rating of perceived exertion (RPE) scale

- **Determining Exercise Duration**
  - The ACSM recommends that vigorous activities be performed for at least 20 minutes at a time, and moderate activities for at least 30 minutes at a time.
# The FITT Principle Applied to the Health-Related Components of Fitness

- **Moderate Intensity 50 – 70%**
  - 50% of 200 = 100
  - 70% of 200 = 140

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Intensity</th>
<th>Time</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>3–5 days a week</td>
<td>55/65–90% of maximum heart rate</td>
<td>20–60 minutes continuous aerobic activity</td>
<td>Continuous aerobic activity that uses large-muscle groups</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Strength</th>
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</thead>
<tbody>
<tr>
<td>2–3 nonconsecutive days a week</td>
</tr>
<tr>
<td>70–85% of maximal resistance. Sufficient resistance to enhance strength and endurance</td>
</tr>
<tr>
<td>1 or more sets (8–12 repetitions) of 8–10 exercises conditioning all the major muscle groups</td>
</tr>
<tr>
<td>Resistance exercises in a full range of motion for all major muscle groups</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Flexibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum of 2–3 days a week</td>
</tr>
<tr>
<td>Sufficient to develop and maintain full range of motion</td>
</tr>
<tr>
<td>2–4 repetitions of each stretch held for 15–30 seconds</td>
</tr>
<tr>
<td>Stretching for all major joints and muscle groups</td>
</tr>
</tbody>
</table>
Borg’s Rating of Perceived Exertion (RPE) Scale

- Multiply target heart rate by 10
Muscular Strength and Endurance

- **Benefits of Strength Training**
  - Can reduce lower back, joint, and muscle pain
  - Postpones loss of muscle tissue due to aging and sedentary lifestyle
  - Helps prevent osteoporosis
  - Enhances muscle definition and improves personal appearance
  - Boosts metabolism
  - Makes you stronger
Calories Burned by Different Activities

- Jumping rope: 420 kcal
- Jogging 7 mph: 400 kcal
- Soccer: 300 kcal
- Singles tennis: 280 kcal
- Walking 4.5 mph: 230 kcal
- Slow swimming: 200 kcal
- Leisure cycling: 140 kcal
- Calisthenics: 130 kcal
- Walking 3 mph: 120 kcal
Muscular Strength and Endurance

- **Muscular strength**—the amount of force a muscle or group of muscles is capable of exerting
- **Muscular endurance**—the ability of the muscle to exert force repeatedly without fatigue

- To achieve muscle strength and endurance, there must be resistance.
  - Weights
  - Heavy hands
# Methods of Providing Resistance

## Methods of Providing Exercise Resistance

<table>
<thead>
<tr>
<th>Body Weight Resistance</th>
<th>Fixed Resistance</th>
<th>Variable Resistance</th>
<th>Accommodating Resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Calisthenics)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Using your own body weight to help develop skeletal muscle strength</td>
<td>• Provides a constant amount of resistance throughout the full range of movement</td>
<td>• Resistance is altered so that the muscle's effort is more consistent throughout the movement</td>
<td>• Sometimes called isokinetic machines</td>
</tr>
<tr>
<td>• Can improve general muscle fitness and muscle tone and help maintain muscle strength</td>
<td>• Requires balance and coordination and may promote development of more joint and stabilizer muscles</td>
<td>• Provides more controlled motion and isolates certain muscle groups</td>
<td>• Maintain a constant speed through the range of motion</td>
</tr>
<tr>
<td><strong>Examples:</strong> Push-ups, pull-ups, sit-ups</td>
<td><strong>Examples:</strong> Free weights such as barbells, dumbbells, and some machines</td>
<td><strong>Examples:</strong> Specific machines in gyms, some home models available, such as Nautilus or Bowflex machines</td>
<td>• Often used for rehabilitation after injury</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>Examples:</strong> Specific machines in rehab facilities and gyms</td>
</tr>
</tbody>
</table>
More men than women report participating in regular exercise three or more days per week.

Levels of testosterone in men – **larger** muscles

Higher VO$_2$max in men (oxygen capacity)

Women have an average of 25 percent body fat and men have an average of 15 percent.

Women have greater hip and elbow flexibility.

Men may have higher levels of blood hemoglobin.
Muscular Strength and Endurance

Strength-Training Elements
- Exercise selection
- Exercise order
- Sets and repetitions
- Rest periods
- Exercise frequency

Core Strength Training
- Strengthens muscles of the deep back and abdominal muscles that attach to the spine and pelvis.
- It is recommended to do core strengthening activities at least three times per week.
- Core exercises: 3x week
  - Yoga
  - Pilates
  - Abdominal curl-ups
Strength Training Exercises
Flexibility

- **Flexibility**
  - Measure of range of motion
  - Enhanced by controlled stretching

- **Types of Stretching**
  - Static stretching – slow, gradual stretching of muscles and tendons, then holding them.
  - Recommended at least two or three days a week, but daily stretching is optimal

- **Styles of Exercises that Include Stretch**
  - Yoga
  - Tai chi
  - Pilates
Stretching Exercises to Improve Flexibility

a. Stretching the inside of the thighs
b. Stretching the upper arm and the side of the trunk
c. Stretching the triceps
d. Stretching the trunk and the hip
e. Stretching the hip, back of the thigh, and the calf
f. Stretching the front of the thigh and the hip flexor
Flexibility
Body Composition

- Describes the relative proportions of lean tissue (muscle, bone, water, organs) and fat tissue in the body.
- Exercise can influence body mass, fat mass, and lean mass.
- Aerobic activities help improve body composition.
- Many ways to assess body composition
  - Height-weight charts - BMI
  - Underwater weighing
  - Body – fat calibration
Creating Your Own Fitness Program

- Overcoming Common Obstacles to Exercise
- Identify Your Fitness Goals
- Designing Your Program
  - Choose appropriate and fun activities.
  - Try something NEW!
  - Be specific.
  - Reevaluate goals and action plan after 30 days.

Which factors should you think about as you develop a fitness plan?

  - Plan it, Start it, Stick to it
    - Start slow
    - One life change at a time
    - Pick a good and specific time
    - Keep a record
# Overcoming Obstacles to Physical Activity

<table>
<thead>
<tr>
<th>Obstacles</th>
<th>Possible Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of time</td>
<td>• Take a good look at your schedule. Can you find three 30-minute time slots in your week?</td>
</tr>
<tr>
<td></td>
<td>• Multitask. Read while riding an exercise bike or listen to lecture tapes while walking.</td>
</tr>
<tr>
<td></td>
<td>• Exercise during your lunch breaks or between classes.</td>
</tr>
<tr>
<td></td>
<td>• Select activities that require minimal time, such as brisk walking or jogging.</td>
</tr>
<tr>
<td>Social influence</td>
<td>• Invite family and friends to exercise with you.</td>
</tr>
<tr>
<td></td>
<td>• Join a class to meet new people who share your exercise interests.</td>
</tr>
<tr>
<td></td>
<td>• Explain the importance of exercise to people who may not support your efforts.</td>
</tr>
<tr>
<td>Lack of motivation, willpower, or energy</td>
<td>• Write your planned workout time in your schedule book.</td>
</tr>
<tr>
<td></td>
<td>• Enlist the help of an exercise partner to make you accountable for working out.</td>
</tr>
<tr>
<td></td>
<td>• Give yourself an incentive.</td>
</tr>
<tr>
<td></td>
<td>• Schedule your workouts when you feel most energetic.</td>
</tr>
<tr>
<td></td>
<td>• Remind yourself that exercise can give you more energy.</td>
</tr>
<tr>
<td>Lack of resources</td>
<td>• Select an activity that requires minimal equipment, such as walking, jogging, jumping rope, or calisthenics.</td>
</tr>
<tr>
<td></td>
<td>• Identify inexpensive resources on campus or in the community.</td>
</tr>
</tbody>
</table>

Creating Your Own Fitness Program

- **Fitness Program Components**
  - Warming up and stretching
  - Resistance training
  - Cardiorespiratory training
  - Cooling down and stretching
# Fitness Gadgets and Equipment

## Table 11.3: Some Popular Fitness Gadgets and Equipment

<table>
<thead>
<tr>
<th>Heart Rate Monitor</th>
<th>Pedometer</th>
<th>Stability Ball</th>
<th>Balance Board</th>
<th>Resistance Bands</th>
</tr>
</thead>
<tbody>
<tr>
<td>A chest strap with a watch device that helps the wearer become aware of heart rate during training.</td>
<td>A small battery-operated device, usually worn on the belt, that keeps track of number of steps. Some models also monitor calories, distance, and speed.</td>
<td>Large ball made of burst-resistant vinyl that can be used for sitting, strengthening core muscles, or stretching.</td>
<td>A board with a rounded bottom that can be used to improve balance and core muscle strength, and to help stretch muscles.</td>
<td>Rubber or elastic material with handles that can be used to work the muscles without the use of weights.</td>
</tr>
<tr>
<td>• Provides instant feedback about the intensity of your workout.</td>
<td>• Great for motivating to get the recommended 10,000 steps per day</td>
<td>• Balls must be inflated correctly to be most effective</td>
<td>• Great for improving agility, reaction skills, and ankle strength</td>
<td>• Can improve muscle endurance, strength, flexibility, and range of motion</td>
</tr>
<tr>
<td>• Needs a good fit for the strap, which may be cumbersome</td>
<td>• Needs to be calibrated for your height, weight, and stride length</td>
<td></td>
<td>• Can be difficult for new users</td>
<td>• Lightweight and portable</td>
</tr>
</tbody>
</table>

Fitness Gadgets and Equipment

**Table 11.3**

<table>
<thead>
<tr>
<th>Fitness Gadgets and Equipment</th>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Free Weights</strong></td>
<td>Rubber, plastic, or metal dumbbells or barbells, often with adjustable weight and used with a weight bench. Some machines have arm movements also. Potential for injury if form is incorrect.</td>
<td>$10–$300</td>
</tr>
<tr>
<td><strong>Elliptical Trainer</strong></td>
<td>A stationary exercise machine that simulates walking or running without causing impact on the bones and joints. Some machines have arm movements also. Nonimpact. Readout and programs vary.</td>
<td>$300–$4,000</td>
</tr>
<tr>
<td><strong>Stair Climber</strong></td>
<td>A stationary exercise machine that provides a low-impact lower-body workout by simulating stair climbing. The degree of workout depends on working against your body weight. Does not provide upper-body workout.</td>
<td>$200–$3,000</td>
</tr>
<tr>
<td><strong>Stationary Bike</strong></td>
<td>A lower-body exercise machine designed to simulate bike riding. Generally easy to use. Comes with varied resistance programs. Recumbent styles offer less strain on back and knees. Does not provide upper-body workout.</td>
<td>$200–$2,000</td>
</tr>
<tr>
<td><strong>Treadmill</strong></td>
<td>Exercise machine for walking or running on a moving platform while remaining in one place. Comes with an emergency shutoff. Different models have varied readouts and programmability. Lower impact on joints than running on most pavements.</td>
<td>$500–$4,000</td>
</tr>
</tbody>
</table>
Transport Yourself

Active Transportation

- Getting out of your car and using your own power to get around
- Reasons to make active transportation a bigger part of your life
  - Adds more exercise into your daily routine.
  - Walking or biking can save you money.
  - You will enjoy being outdoors.
  - Contributes to the reduction of air pollution.
  - Helps to reduce traffic.
  - Contributes to global health.
Fitness-Related Injuries

- **Causes**
  - Overtraining syndrome
  - Traumatic injuries
  - Overuse injuries
- **Common Overuse Injuries**
  - Runner’s knee
  - Shin splints
  - Plantar fasciitis
Fitness-Related Injuries

- **Treatment of Fitness-Related Injuries**
  - RICE
    - Rest
    - Ice
    - Compression
    - Elevation

- **Preventing Injuries**
  - Appropriate footwear
  - Appropriate protective equipment
Anatomy of a Running Shoe

- Toe box
- Midsole
- Arch support
- Outersole
- Wedge
- Heel counter (inside shoe)
- Padding
Fitness-Related Injuries

- **Exercising in the Heat**
  - Acclimate.
  - Avoid dehydration.
  - Wear appropriate clothing.
  - Use common sense.
  - Cool off frequently
  - Drink cool/cold water or fluids
  - Salt tablets may be needed

- **Three Heat Stress Illnesses**
  - Heat cramps
  - Heat exhaustion
  - Heatstroke
Heat Exhaustion

Symptoms:
- muscle cramps
- pale, moist skin
- usually has a fever over 102 degrees
- nausea or vomiting
- diarrhea
- headache
- fatigue or weakness
- anxiety, and faint feeling

First Aid:
- Move to a cool place and rest
- Give cool sports drinks containing salt and sugar such as Gatorade
- If no improvement or unable to take fluids, GO TO THE EMERGENCY DEPT
Heat Cramps

Symptoms

• Painful cramps, especially in the legs
• Flushed, moist skin
• Mild fever, usually less than 102.5 F

First Aid:

• Move to a cool place and rest.
• Remove excess clothing and place cool cloths on skin; fan skin
• Give cool sports drinks containing salt and sugar such as Gatorade
• Stretch cramped muscles slowly and gently
Fitness-Related Injuries

- **Exercising in the Cold**
  - Hypothermia concerns
    - Consider the weather.
    - Wear layers.
    - Hydrate.
  - Exercise with a friend.
  - Prevent muscle cramps.
Treatment for Hypothermia

- Warm the person up slowly
- Remove wet or damp clothing
- Give warm fluids
- If severe, go to the Emergency Room